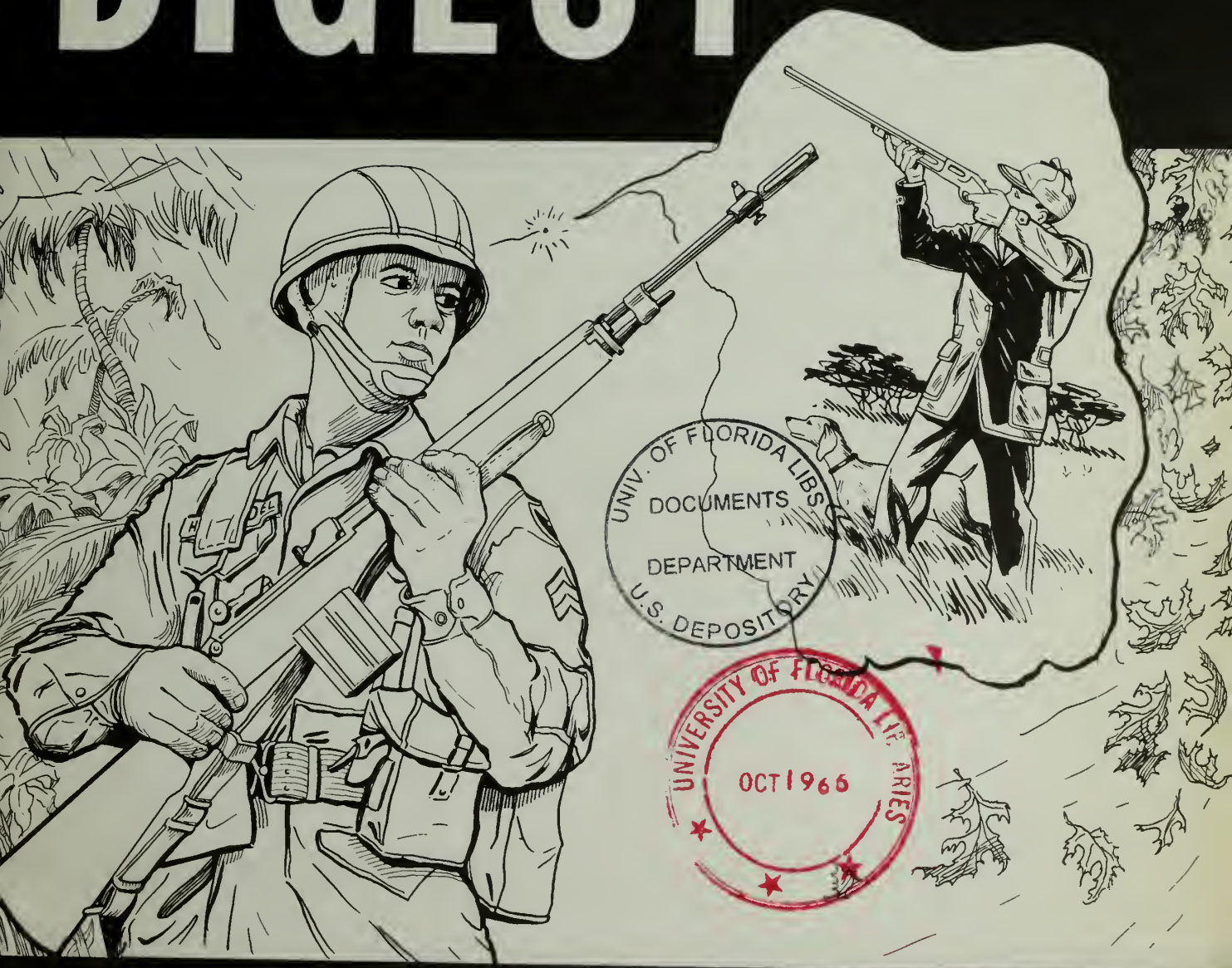
D 101.22/
3:385-73

AMC Pamphlet
AMCP 385-73

# SAFETY DIGEST

SEPT 1966



UNIV. OF FLORIDA LIBS.
DOCUMENTS
DEPARTMENT
U.S. DEPOSITORY

UNIVERSITY OF FLORIDA LIBRARIES
OCT 1966

ECOM SAFETY OFFICE

FIRE PREVENTION WEEK · OCTOBER 9-15

HEADQUARTERS
UNITED STATES ARMY MATERIEL COMMAND
WASHINGTON, D.C. 20315

# AMC Pamphlet 385 - 73 SEPT. 1966

The Safety Digest is an AMC Pamphlet prepared by the Safety Division, Headquarters, U. S. Army Materiel Command. Its purpose is to disseminate information which can materially influence and improve safety programs at all Command establishments.

Articles are included to supplement technical knowledge as well as practical knowledge gained through experience. They provide a basis for the further refinement of safety measures already incorporated in operating procedures and process layout. To achieve maximum effectiveness, the Safety Digest should be given widespread circulation at each AMC establishment.

Articles appearing in the Safety Digest are unclassified and are not copyrighted. They may be reproduced as desired in order to bring pertinent accident prevention information to the attention of all employees. The Army Materiel Command Safety Digest should be given a credit line when articles are extracted.

Unclassified material believed to be of interest or benefit to other establishments is welcome for publication in the Safety Digest. Please send articles for review to: U. S. Army Materiel Command Field Safety Agency, Charlestown, Indiana. If possible, include pictures, charts, drawings, and illustrations that clarify and heighten interest in your presentation.

SELWYN D. SMITH, JR.
Major General, USA
Chief of Staff

OFFICIAL:

STANLEY J. SAWICKI
Colonel, GS
Chief, Administrative Office

# IN THIS ISSUE


FOREWORD . . . . . I
IN THIS ISSUE . . . . . II

SAFETY CONSIDERATION FOR LASERS . . . . . 1
WINTER IS PEAK SEASON FOR FALLS . . . . . 9
SUPERVISOR'S SAFETY CHECK LIST . . . . . 11
LINEMAN ANCHORED TO SNORKEL . . . . . 12
SERVICE TEST OF PARACHUTE LOW ALTITUDE DELIVERY SYSTEM (PLADS) . 13
COURTEOUS DRIVERS CLUB REDUCES OFF-POST INJURIES . . . . . 14
CURRENT EVENTS
- BUNGLED SEAT BELT FASTENING MEANT DEATH . . . . . 15
- CLEANING COMPOUND FUMES DISABLE WORKER . . . . . 16
- CLUTTERED TABLE LED TO THIGH WOUND . . . . . 16
- ONE-HANDED CLIMBING CAUSES FALL . . . . . 17
- THE CASE OF THE PROTRUDING FOOT . . . . . 17

WATCH OUT FOR SMALL FRY . . . . . 18
PREPARE NOW FOR SAFER WINTER DRIVING . . . . . 19

EXPLOSIVES SAFETY
- PROPER RESPECT FOR HAZARDOUS METERIAL . . . . . 22
- PILOT SHIELDING FOR HELICOPTER ROCKET TESTS . . . . . 25
- MEASURING BLADE CLEARANCES IN VERTICAL PLANETARY PROPELLANT MIXERS . . . . . 27

OFF-THE-JOB ACCIDENT PREVENTION . . . . . 29
DERMATITIS: CAUSE AND PREVENTION . . . . . 31
SAVANNA ARMY DEPOT ACHIEVES 1,000-DAY SAFETY RECORD . . . . . 32
NSC SAFETY AWARD NOTIFICATION . . . . . 33
PHOTO OF LIGHTNING STRIKE AT LOUISIANA ARMY AMMUNITION PLANT . . . 33
OUR STOP SIGNS ARE RETIRING . . . . . 34
DO YOU KNOW? . . . . . 35
C. F. CRAVER, RAVENNA ARMY AMMUNITION PLANT, DEAD AT 54 . . . . . 36
REFERENCE PUBLICATIONS . . . . . 37
WELL, DID YOU KNOW? . . . . . 38
SAFE DRIVING BRINGS EMPLOYEE RECOGNITION . . . . . 40

Digitized by the Internet Archive
in 2016

https://archive.org/details/safetydigest1966wash_3

# SAFETY CONSIDERATIONS FOR LASERS

Lyman E. Pevey, Safety Director
U.S. Army Engineer Research and Development Laboratories
Fort Belvoir

Regardless of the area of technology in which his organization operates, the Safety Director is liable to find that one of the little black boxes coming in the back door contains a laser. Such was the case at Springfield Armory. Immediate steps were taken by Safety, Medical, and Research personnel to promulgate and implement hazard control procedures and devices for protection of personnel involved with its operation.

Although numerous articles have been written on the hazards associated with lasers, much of the information contained in early publications is out-of-date and misleading. Laser technology is growing and changing rapidly. Safety personnel must keep abreast of the new hazards that may arise in this new technology in order that the identified accident potentials may be controlled before accidents occur.

Coordination of Safety, Medical, and Research personnel at Springfield Armory led to a compilation of data on safety considerations for the use of lasers and related equipment. The discussion of laser accident potentials and the recommended safe practices for laser operation contained herein based upon discussion of and recommendations from several articles articles appearing in publications. These include the ASSE "Journal," December 62 and April 63; U.S. Department of Labor "Safety Standards," May-June 65; U.S. Atomic Energy Commission

● *EDITOR'S NOTE:*

Mr. Pevey wrote this article while he was Safety Director at Springfield Armory. He recently began his new assignment as Safety Director, U.S. Army Engineer Research and Development Laboratories, Fort Belovir. Office of the Surgeon General advised that a tri-service guidance paper is being prepared on precautions to be taken when lasers are used in the laboratory.

"Health and Safety Information," Issue No. 194, 31 August 65; "Occupational Hazards," Dec 64; "National Safety News," Feb 65; Martin-Marietta Corp. publication, "What You Should Know About Laser Safety," 65; and the Federation of American Societies of Experimental Biology publication, "Biological Effects of Laser Radiation," Federation Proceedings, Jan-Feb 65, Supplement No. 14.

While few authenticated cases of injury to workers have come to the attention of authorities in this field, all agree that the potential hazards of lasers are considerable. Of greatest concern has been the potential for eye injury. Results of medical research have shown instantaneous thermal injury to the retina and iris in experimental animals.

Due to the high degree of collimation, the laser beam intensity diminishes only slightly even at great distances. According to the U.S. Atomic Energy Commission, eye damage could result from looking directly into the beam at a considerable distance, even up to several miles.

It is apparent that exposure to the direct laser beam is not the only source of eye damage. Its reflection can be harmful, too. In a recent "General Safety Guide for Laser Users," the AEC states that the potential for specular reflections shall be minimized by the removal of all unnecessary shiny surfaces in the general direction of the beam. Such reflections may arise not only from mirrors and the front surfaces of lenses, but from objects such as door knobs, polished table tops or walls, and metal or glass containers.

Eye injuries and tissue burns are the most serious hazards associated with lasers. However, there are other potential injury sources requiring attention. They include: Flying particles from exploding wire which is sometimes used as a light source; shrapnel from an imploding light tube or the implosion of vessels containing cryogenic materials; light sources or reflections which give off ultraviolet or infrared radiation; the brilliant flashes from the "pumping" light; electrical shock and burns resulting from input power or capacitor discharge; low-voltage power supplies to instrumentation and accessories; fires and/or explosions caused by a misdirected laser beam; coolants (liquid nitrogen, liquid helium) which can cause serious "burns" on contacting the eyes or skin; oxygen depletion resulting from massive escape of coolant gases; toxic oxides or nitrogen or ozone generated by ultraviolet radiation; common industrial hazards arising from poor housekeeping, materials handling; makeshift or defective equipment.

Effective measures for controlling hazards of lasers and their associated equipment generally involve well-known principles and techniques. As to the beam itself, considered by experts as the major hazard, the general rule for complete safety against eye damage has been to never directly view the laser beam or its reflections. Much research has been undertaken in an effort to establish safe ranges for direct viewing. The Martin-Marietta Corporation in its publication, "What You Should Know About Laser Safety," has included an eye hazard nomogram that takes into consideration loss factors, size of pupil in millimeters, laser output in joules, retinal energy density threshold, and laser beam width in milliradians and allows one to estimate the safe range for direct viewing.

Inquiry to the Office of the Surgeon General regarding availability of a laser hazard indicator (that operates similar to a slide rule and allows one to determine safe ranges for direct viewing of laser beam) for use by AMC Safety personnel resulted in comment that these devices are products of the Martin Company, but are not yet ready for general distribution. At this time sufficient official information is not available to determine exactly what the safe range is for direct viewing of the beam or its reflection. Until such time that this information becomes available, there should be no direct viewing at all. It follows that careful planning of facilities and operations is essential. Consideration should be given to "built-in" safety features, wherever possible, throughout the design, construction, and installation of laser facilities.

The controls and protective measures that must be implemented to minimize the risk of injury to employees include appropriate provisions for physical, procedural, and medical controls. While the controls that must be applied in any given situation will vary in accordance with the power output of the unit and local conditions, consideration should be given to the following:

● 1. EQUIPMENT

a. "Built-In" Safety Features: Consideration should be given at the design, construction, and installation phase of laser development to assure "built-in" safety features are incorporated.

b. Electrical Hazard Potentials: Standard electrical safety specifications and practices prescribed for high-voltage equipment in general are applicable to laser power sources.

All electrical cables, terminals, and switches should be so arranged as to prevent accidental contact with energized circuits.

Proper grounding should be provided for all noncurrent carrying conductive parts of the equipment, including instrumentation, chassis, and shields.

High-voltage components should be protected with electrically interlocked doors or barriers to prevent access to energized components.

Since capacitors can retain a charge even when the power source is disconnected they should be equipped with bleeder resistors capable of rapidly discharging the capacitor when de-energized.

Insulated grounding bars or wands should be available at each laser unit for manual discharging of residual capacitor energy.

To further guard against potential injury from electrical shock, instrumentation and auxiliary equipment using low-voltage electricity should conform to applicable provisions of the latest edition of the National Electrical Code.

c. Shielding: Adequate enclosure or shielding is required to contain the laser beam, "pumping" light source, flying particles and possible radiation sources other than the beam itself.

When exploding wire flashing devices are used as a light source for "pumping" lasers, they should be shielded to contain flying particles and fire in the event of an implosion or explosion.

Flash lamps should be fully enclosed to prevent exposure to the intense light and ultraviolet and infrared radiation.

All equipment operating in excess of 15,000 volts should be treated as a potential source of X-ray radiation and should be monitored periodically for unintentional emission. In the event of harmful levels of radiation, the components producing the radiation should be shielded and labeled. (Editor's Note: Warning signs alone are not adequate to insure

protection of personnel. Rooms or buildings that enclose laser operations should be equipped with both visual warning signs and an interlock system. In case of an inadvertent entry the interlock system should disconnect the power from the laser.)

Cryogenic equipment and fittings should be protected or so arranged as to preclude injury in event of failure of any part of the cooling system. If coolant is discharged into room, a check should be made for oxygen depletion. This hazard is minimized by adequate ventilation.

d. Equipment Controls: It is suggested that lasers be equipped with keylock switches which allow removal of the key only when the circuit is open.

e. Laser: The laser should be securely fixed in position so that it may not be inadvertently swung, tilted, or otherwise misaligned with the target.

● 2. WORK AREA

a. Location of Equipment: All laser experimentation conducted inside a building should be performed inside a totally enclosed room or area which is restricted to those personnel immediately involved in the project. This should prevent exposure to personnel who are not familiar with the hazards.

b. Illumination: Rooms in which lasers are to be operated should be well lighted to avoid enlarging of the pupil of the eye and overexposing the retina in the event of accidental exposure to the laser beam.

c. Ventilation: The room or area should be equipped with adequate mechanical ventilation.

d. Surfaces: The area should be free of reflective surfaces which could bounce the beam into a person's eyes. Chief suspects include doorknobs; desk, table, and counter tops; metal or glass containers; walls; cabinets; and personal jewelry. Target screens or other surfaces used for purposes of demonstration or study of beam should have a diffused, dull or sandblasted surface. If a reflective surface is required, the angle of reflection should be predetermined and adjusted to insure that the reflective beam can be effectively absorbed.

e. Enclosed Firing Range: Wherever possible the laser should be beamed into an enclosed firing tube or box which prohibits the operator from viewing direct or specularly reflected beam. In all cases the area between laser and target must be equipped with barriers or so located that no person may inadvertently pass through the direct or reflected beam should the target be misaligned, removed, or penetrated.

f. Warning Devices: The room or area in which a laser is used should be regarded as a controlled area with access limited to those whose work requires it. This should be indicated by appropriate signs at each door to the room. Within the controlled area, an audible and/or visible signal should be associated with the charging of the laser condenser to indicate that the laser is about to be flashed or is running continuously. Signals should be such that they will not cause a person to look in the direction of the laser, but rather away from it.

g. Housekeeping: The common industrial hazards of poor housekeeping should not be overlooked in the room where lasers are housed. Components, parts, supplies, and tools not used during the set-up or operation of lasers should be properly stored, keeping the immediate area in orderly condition. Laser areas should be free of all unshielded combustible material because of the beam's ability to ignite such substances at considerable distances. (Shielding materials should be tested by exposure to the beam before being used regularly.

● 3. OPERATION

a. Safe Operating Procedures: In each area where lasers are operated safe operating procedures applicable to the operation and the area should be identified and made part of the operating instructions of each such piece of equipment.

b. Coordination: There should be full and complete coordination between Safety and Operating personnel. Without it, maximum safety is not likely to be maintained.

c. Indoctrination: All personnel in areas using lasers should receive full instructions concerning the hazards of the equipment and of direct and reflected laser beams.

d. Authorized Use: Only authorized personnel should be permitted to set up, adjust, or operate laser equipment. The use of laser for unnecessary or unauthorized purposes or for periods of time beyond that which is absolutely necessary should be prohibited. It is recommended that at least two

persons be present at all times when lasers are being operated. Preferably, they should be trained in first-aid procedures, including artificial resuscitation methods.

e. Warnings: Personnel should be alerted prior to the firing of any laser device in order that they might take precautions to shield or otherwise protect their eyes. The "countdown" technique is recommended for pulsed lasers.

f. Viewing of Beam: No safe limit has been established for exposure to a laser. Viewing of the direct or specularly reflected laser beam should not be permitted, irrespective of the beam intensity. Because of the possibility of accidental exposure, visual alignment of the beam source should not be undertaken while the power supply is energized.

g. Eye Protection: Anti-laser glasses are made which provide a measure of eye protection. However, experts say that a given glass is effective only for one particular wave length range and intensity and should not be used as a substitute for other control measures. Magnifying the beam through a simple lens may render this eye protection useless. The AEC warns that no one should look directly into a laser beam even while wearing optical absorbing lenses. The AEC also recommends periodic testing of anti-laser glasses, because some have been found to deteriorate in time.

h. Unattended Lasers: Under no circumstances should the laser equipment be left unattended while in an energized state.

i. Possession of Keys: On lasers equipped with keylock switches, keys should be assigned only to authorized personnel who are responsible for operation of the laser equipment.

j. Adjustments, Repairs, Cleaning: Capacitors should be discharged before adjustments, cleaning, or repair work is undertaken. Since they can retain a charge even when the power is disconnected, bleeder resistors should be provided and left in the circuit until the laser is ready to be used. Units should be flashed once after the switch is turned off to remove most of the residual charge from the capacitors. Insulated grounding bars or wands should be used for manual discharging of residual capacitor energy.

k. Tagging and/or Lockout Procedures: A tag-out and/or lockout system should be used to provide assurance that all connections, adjustments and repairs are accomplished with power supplies disconnected.

1. Flammable Materials: Laser beams should never be directed towards highly flammable or explosives materials, liquids, gases, or vapors even at long distances. Care should also be taken to insure that the laser beam is not deflected toward these objects.

## ● 4. MEDICAL CONTROLS AND PERSONNEL PROTECTION

a. Eye Examinations: An employee assigned to work with lasers should receive a complete eye examination prior to such assignment. The results should be permanently filed with his medical records. This is important in determining whether retinal scarring is received should he be exposed to a laser beam. Follow-up eye examination should be done at least on an annual basis. Some authorities suggest that all persons exposed to laser hazards be given a thorough eye examination by an opthalmologist every 6 months.

b. Radiation Film Badges: Persons who work with lasers which operate at high voltage (above 15,000 volts) and are known to produce X-radiation should be required to wear film badges.

c. Accidental Exposure: An accidental visual exposure to direct or reflected laser beam or incidents resulting in persisting after-images of a light source should be immediately reported to the local medical authorities.

d. Protective Equipment: Eye protection designed for laser work should be worn whenever possible, but never used for direct viewing of the beam. Cryogens, such as liquified nitrogen and helium used for cooling laser equipment, demand personal protection -- hands, face, and body -- for all who handle them.

It is important that Safety personnel, as well as scientific personnel, be knowledgeable on lasers, possible hazards, and adequate control measures before, not after, they are exposed. Based on the above, Springfield Armory implemented procedures and controls to make its use of laser equipment a safe operation.

# WINTER IS PEAK SEASON FOR FALLS

Though many popular beliefs prove to be incorrect, one generally held idea about accidents is firmly grounded on facts. There are more falls in the winter months than at other times of the year.

The graph that appears with this article shows how AMC disabling injuries from falls rose in the winter months of FY 1966. National Safety Council data also shows that the number of fatalities caused by falls during the cold weather season are above average for the full year. A check of your record of first aid injuries and personal observation is also likely to provide abundant evidence that winter is your peak season for falls.

There are practical steps you can take to prevent a winter upturn in falls among your personnel.

1. Analyze your problems. Here is what you are likely to discover:

a. Most of the situations that can lead to falls in warm weather continue to be present when the season grows cold. This is certainly true of the indoor tripping hazards that produce same level falls.

b. Rain, snow, ice, and increased hours of darkness create additional hazards. All of our personnel are exposed to some or all of these.

2. Develop a plan to meet the situation. It should include the following:

a. Publicize the seasonal hazards. Make use of posters, promotional publications, supervisors, to remind your people of the winter hazards. Keep the subject fresh on their minds by frequent reminders throughout the winter.

b. Arrange for necessary work to be done to cope with winter weather hazards. Have snow removal and ice sanding plans ready to be put into effect the instant action is needed. The time to act is before, not after people fall in the parking lot, on walkways, and on steps.

c. Check up on the lighting situation, inside and outside buildings. Are changes needed before bad weather comes?

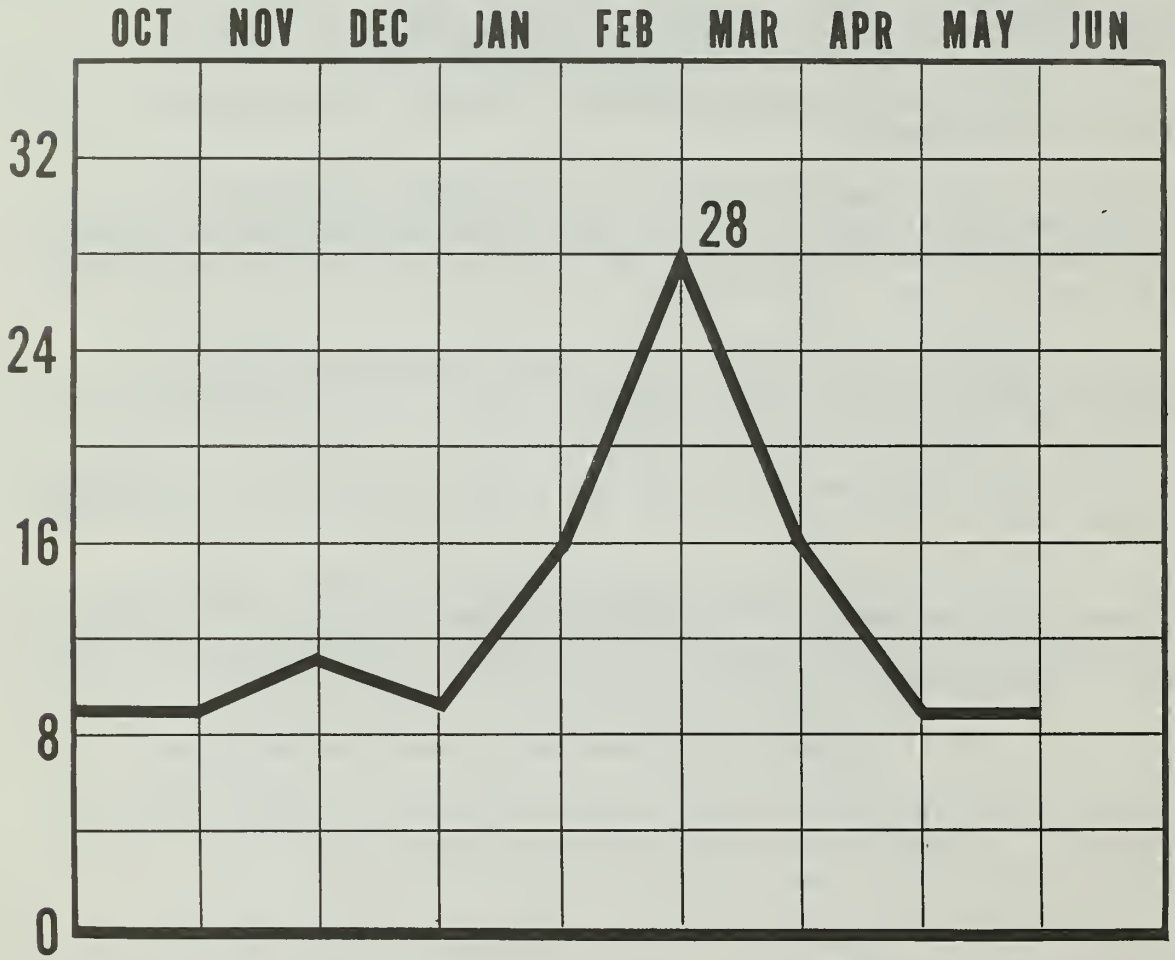
d. Determine actions that may be taken to improve your year-round program of preventing falls. Intensify efforts to prevent all falls.

3. Take action to put your program into effect. Work at it yourself. Secure the active effort of all personnel and particularly supervisors.

Falls are unnecessary. Apply the recognized safety measures that will prevent them. The time to prevent them is today and every day this year.

## AMC DISABLING INJURIES FROM FALLS

● *WINTER - FY 1966*



# SUPERVISOR'S SAFETY CHECK LIST

YES/NO 1. I accept safety as just as much a part of my job as production, quality, or cost.

YES/NO 2. I recognize the relationship between good safety, good housekeeping, and good management.

YES/NO 3. I give adequate safety instruction to every new employee and to every old employee starting a new job.

YES/NO 4. I impart to all employees the understanding that the violation of standard safe work practices is just as serious as the violation of any other company rule.

YES/NO 5. I take corrective action when safety rules are ignored.

YES/NO 6. I see that necessary personal protective equipment is provided.

YES/NO 7. I always set a good safety example myself.

YES/NO 8. By personal contact or group discussions, I make it possible for each employee to take part in the safety program.

YES/NO 9. I do not permit the use of new or relocated machines or equipment by employees until I am satisfied that the necessary protective devices have been provided and the employees have received safe operating instructions.

YES/NO 10. I investigate and determine the cause of <u>all</u> injuries, even the minor cases.

YES/NO 11. I am constantly watchful for and I take immediate steps to correct unsafe work procedures.

YES/NO 12. I see that all injuries are reported and promptly treated.

- Safety Topic Pamphlet, May 1966
Thiokol Chemical Corp.
Longhorn Division
Longhorn Army Ammunition Plant

# LINEMAN ANCHORED TO SNORKEL

Arthur M. Crook
Safety Officer, Joliet Army Ammunition Plant

The July 1965 issue of the Safety Digest described how a lineman at an AMC installation fell 24 feet to the ground when reduced hydraulic pressure caused a sudden tilting of the "skylift" bucket.

At the Joliet Army Ammunition Plant linemen are not permitted to use the hydraulically lifted bucket until one of two types of safety harnesses is installed.

Photo 1

Photo 1 shows a bucket with 2 separate safety anchors installed. The lineman has his safety line hooked to his safety belt and an anchor inside the bucket. The available outside anchor is attached to the bucket corner that appears at the left front in the picture.

Photo 2

Photo 2 shows a lineman with his safety line secured to the snorkel boom.

When the lineman has fastened his safety line to either of the three hooks shown he will not fall to the ground even if the support pin should shear and the bucket topple.

# SERVICE TEST OF PARACHUTE LOW ALTITUDE DELIVERY SYSTEM (PLADS)

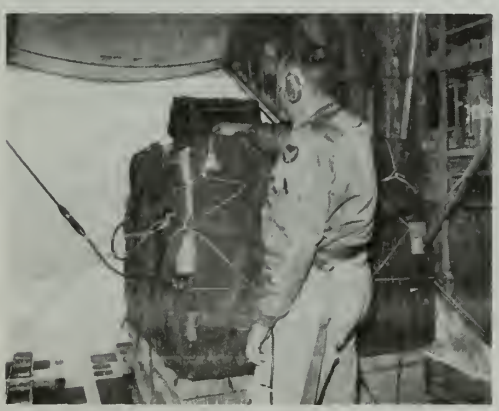
Photographs of Joint U.S. Army/U.S. Air Force Service Test of Parachute Low Altitude Delivery System (PLADS). Test conducted at U.S. Army Airborne, Electronic and Special Warfare Board, Fort Bragg, North Carolina are shown below.

PLADS was developed by U.S. Air Force as a means of delivering individually rigged A-22 containers at low altitudes, using high velocity techniques from U.S Air Force C-130 aircraft.

Safety confirmation criteria included ease of safety inspection, minimum personnel exposure hazard in preparation and use, and danger to aircraft in event of extraction system failure.

The test agency considered PLAD System safe for its intended use.

PHOTO 1
PLADS load positioned on the aircraft ramp for extraction.



**Loadmaster** preparing to release the parachute into the slip stream.

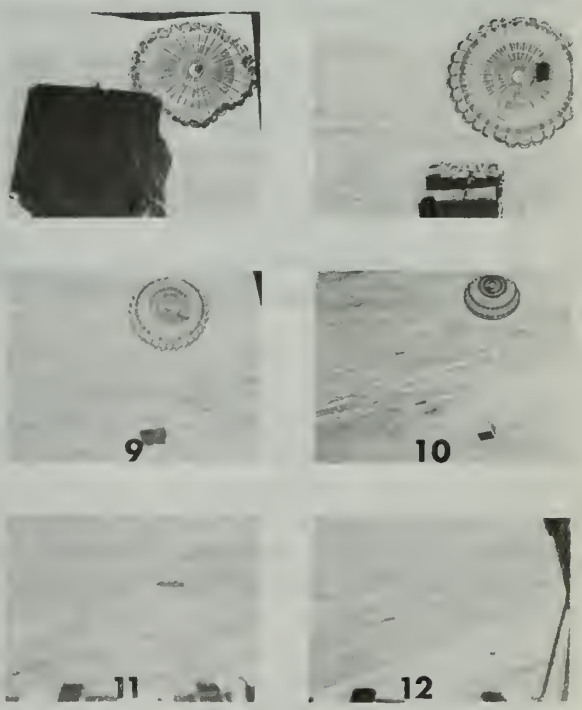



PHOTO 3
Sequence showing parachute deployed; disreefed; fully inflated; load extraction; descent and load impact.

# COURTEOUS DRIVERS CLUB REDUCES OFF-POST INJURIES

The activities of a Courteous Drivers Club at the Longhorn Army Ammuntion Plant have been reflected in a reduction of off-the-job injuries. In the first 5 months the club operated, 2 employees received disabling injuries in off-the-job motor vehicle accidents. In the similar 5-month period of the preceding year there were 9 such accidents.

The Courteous Drivers Club was organized among Longhorn Army Ammunition Plant personnel in January 1966. It was incorporated in the 1966 Master Safety Program prepared by C. D. Attaway, Chief Safety Engineer for the Longhorn Division, Thiokol Chemical Corporation, operating contractor at the Plant.

> The purpose of the club is to develop safe driving habits among employees and to encourage all personnel who own or operate motor vehicles to obey traffic rules and regulations during normal off-the-job activities.

Employees who join the club agree to abide by rules contained in a pledge card they are asked to sign. They are given membership cards and bumper decals. Membership is voluntary, but only members with accident-free records are eligible to win a savings bond prize awarded once a week. The winner is picked by drawing the member's social security number.

Membership in the club is terminated automatically by the loss of a member's driving license from action by law enforcement officers or by termination of employment.

A high percentage of the Longhorn Army Ammunition Plant employees have joined the Courteous Drivers Club. The club's members and the plant have been benefited by the reduction in the number of off-the-job vehicle accidents and injuries.

## BUNGLED SEAT BELT FASTENING MEANT DEATH

Two soldiers were returning to their post after midnight in a light foreign-made car. The driver fastened his seat belt and observed that his companion was manipulating the straps of his belt as if to fasten it.

The weather was dry and clear and the driver was making good time. When he drove into a curve he found his speed was too fast. The vehicle swerved off the right side of the road, turned over twice, went up an 8-foot embankment and came to rest right side up.

His seat belt held the driver in place. He had a low back sprain and multiple bruises and lacerations, and he was able to return to duty in a few days. His passenger had bungled his seat belt fastening and was not held in his seat. He was thrown out of the car when it first left the highway. A bone in his chest was fractured and he died from an accumulation of blood in his lung cavity.

The driver had received a holiday traffic briefing a few weeks before the accident. Following the accident a general safety briefing was held for all the personnel of his company.

## CLEANING COMPOUND FUMES DISABLE WORKER

A contractor employee was preparing to remove a coating of wax from the asphalt tile floor of an office. An ammoniated cleaning compound was to be dissolved in water to be used with a floor mop.

The worker placed his mop bucket in the sink of a small utilities room. He then poured one cup of the wax removing chemical in the bucket and turned the handle of the hot water tap. The hot water pouring on the compound caused a rapid release of fumes, which were confined to the small room.

The fumes set the man to coughing to such an extent that he could hardly get his breath. A normally dormant asthmatic condition was aggravated and the employee required hospitalization. He was away from work for two days.

To prevent other employees being harmed by inhalation of fumes the following instructions were issued:

1. The ammoniated cleaning compound would not be mixed with water in any confined area such as a janitor's utility room.

2. The wax removing chemical would be mixed into the water, rather than water being poured over the compound. The purpose of this change of procedure was to prevent the rapid release of a strong concentration of fumes.

## CLUTTERED TABLE LED TO THIGH WOUND

This special drawing table was loaded with materials an Army employee used in his work. The items included jars of paint, a variety of materials used in drawing, and a knife. The blade of the knife extended beyond the edge of the cluttered table.

The worker paused to talk to another employee. While he talked, he stood with his back to his table. He then turned quickly toward his work and came into contact with the knife. The knife was lodged so firmly among the other working equipment that it did not slide back when touched. The blade cut through the man's trousers and penetrated the muscle tissue of his right thigh. The wound caused him to be away from work for 8 days.

The employees of the man's organization were instructed to maintain orderly working conditions in their work areas. They were also ordered to keep sharp-edged instruments in holders whenever they were not being used.

## ONE-HANDED CLIMBING CAUSES FALL

An Army employee had a welding job to perform on the roof of a building. He selected a welding rod and placed it, a chipping hammer, and a small bar inside his welding helmet. He put the helmet under his right arm and started to climb a ladder to the roof.

The 14-foot fixed-rail, metal ladder he climbed was fastened to the wall and the concrete paved dock of the building. Using his one free hand to help with his climbing the welder went up without incident until he reached for the last rung. His hand missed the rung and he fell backwards. He landed in a sitting position on the concrete dock, about 8 feet below the rung on which he had been standing.

His injuries included fractures of his right wrist, his right heel and 2 vertebrae. It was estimated he would be away from work for 8 weeks.

The installation instructed its employees to use a line and a container to raise tools and operating equipment to working areas that have to be reached by ladder.

## THE CASE OF THE PROTRUDING FOOT

An experienced operator was using an electric forklift truck inside a concrete storage igloo. With a load of empty pallets on the lift forks he started to drive through the open doorway. The entrance was 48-inches wide and its heavy door opened outward.

The worker was so intent on moving the load through the opening that he failed to notice the position of his feet. The toe of the left foot protruded well out over the edge of the forklift floor plate.

As the truck moved through the doorway the man's foot came into contact with the wall. Before he could move it back to safety, the foot was twisted and wedged in a 4-inch wide space between the concrete wall and the moving machine. In a startled effort to free himself, the worker accidentally steered the machine to the left. This increased the pressure on the caught foot.

The forklift moved forward about 12 inches before the left front wheel ran off the side of a wooden leveling platform. This stopped the machine. By this time the pinned foot had been dragged against the edge of a heavy hinged door. Pressure against it was sufficient to tear the man's steel-toed safety shoe.

The great toe on the worker's left foot was fractured. There were contusions and abrasions on his left foot, shin, calf muscles, and knee. Estimated time lost was 15 days.

The accident was publicized as a part of the installation's training program for its materials handling equipment operators. The injured driver was given remedial training.

## WATCH OUT FOR SMALL FRY

A proud moment isn't it? Little Johnny swinging his lunch pail, off to his first day in school. Doctor, lawyer, Indian-chief? We, you and I, and this community have a stake in Johnny's future; it could be cut short. Last year almost 3,200 little boys and girls like Johnny were killed and another 160,000 were injured all across America in traffic accidents. We must do our best to see that our younger citizens have the opportunity to grow to be tall and strong.

What must we do to protect this our greatest of resources? Safety education begins in the home. We, as parents, must explain to our children the dangers of disregarding traffic signals or the commands of crossing guards, crossing the street without looking, and of jaywalking. We must show them the safest and most direct route between home and school. And above all, by work and example instill in them a respect for the traffic laws of our state and community.

Home training is not the complete answer. Anxiety remains as the door slams and Johnny dashes off to school. Will he get there, will he return home, or will there be a dreaded phone call from the hospital or morgue? Only we drivers can remove this source of anxiety when children are on the streets between home and school. We must be alert, doubly alert around schools and playgrounds and when children are most likely to be on our streets. We must constantly be aware of the heartbreak and loss that can be caused by even a momentary lapse behind the wheel. Be alert, obey the 20 m.p.h. speed zone around schools, give Johnny a "brake."

Savanna Army Depot

# PREPARE NOW FOR SAFER WINTER DRIVING

The next few weeks, while the weather should be good, provide an ideal time to prepare for the coming months of winter driving.

Here are the conditions that make winter driving more difficult and more hazardous in most areas:

1. The hours of darkness will increase. Personnel will be driving to work and returning home in darkness. A greater amount of their off-post driving will be done after dark.

2. The exposure to wet and slippery roads will rise. In most areas, more precipitation falls in the winter months, either as rain, snow, or sleet. The moisture is retained on the roads longer, as slowly evaporating water, or as slush, ice, and snow.

3. Adverse conditions that make driving difficult will increase. Examples of these are fog, freezing rain, blowing snow, and high winds.

4. Extremely cold weather can make any travel more hazardous by the strain it may exert on personnel and vehicles. Mechanical failure is more likely to immobilize cars and trucks that are not in first class condition. Windshields may frost if the heat circulating system is defective.

Much can be done to make winter driving safer. Prepare your personnel by getting into their hands and minds the information they will need to drive safely. The individuals themselves must take the actions that will prevent their own accidents and injuries. They should be furnished complete facts at the start of the season and be given frequent reminders of important facts and hazards.

Here is a summary of information they will need. More may be required to meet particular local conditions.

● 1. Darkness. Under ideal conditions, after-dark driving has hazards not present in the daylight hours. In the winter months, much more driving will be at night or under poorer lighting conditions. Emphasis needs to be given to slower driving, adequate distance for vehicle control and

stopping on slippery roads, obedience to traffic instructions furnished by road markers, the hazards posed by unlighted vehicles and obstacles, and the lights of other cars. Passing will be more difficult and the road conditions encountered may suddenly grow worse.

● 2. Fog. Extra alertness and caution are required to drive in fog, for appearances are deceptive. Headlights and taillights should be turned on to aid vision and to make the vehicle visible to others. Driving speed should be reduced to a rate where the vehicle can stop within the distance the road and objects thereon can be seen. Heavy fog conditions may indicate a need to get off the road and park.

● 3. Rain. Rain reduces visibility and lengthens stopping distance. The vehicle is more difficult to control, because the road is more slippery. At speeds beyond 40 miles per hour water starts to build up beneath the wheel, and the tire contact with the pavement begins to decrease. At about 50 miles an hour the tire surfaces begin to leave the road. In tests conducted by the National Aeronautics and Space Administration, an automobile traveling at 52 miles per hour actually "hydroplaned" on wet pavement surfaces.

● 4. Frost, freezing rain, sleet, and snow. These call for efficient heating and defrosting equipment to maintain visibility. Special snow and ice driving techniques are required. Braking distances increase, with the amount depending upon the nature of the icy or snowy surfaces. Sudden braking can start skids.

● 5. Unexpected conditions. Winter driving can be full of surprises and drivers should be prepared for them. Sections of dry pavement are often punctuated by icy bridges. Road surfaces can change from good to bad in short distances. Weather can change radically within short periods of time.

● 6. Vehicle conditions. Particular attention should be given to the following:

a. Tires. Make certain the tread is good and the tire is properly inflated. In some locations and under some conditions snow tires or chains may be required.

b. Windshield wipers. The arms should have the proper tension and the blades should wipe clean. If the rubber is deteriorated or if streaks are left on the windshield, the blade should be replaced.

c. Brakes. Have them equalized to prevent swerving when they are applied.

d. Lights. All should be in perfect working order. The glass should be kept clean.

e. Muffler. Carbon monoxide fumes may be encountered. Make certain that a defective muffler or tailpipe does not cause an injury or death.

f. Seat belts. Install them, and use them whenever the car is in motion.

g. Heating system. Make certain the heater and defroster operate properly.

h. Radiator. Make certain the radiator has no leaks and that it contains antifreeze that matches climate needs.

i. Extras. A box of sand, a shovel, a flashlight, a snow brush and scraper, a flare, and a first-aid kit should be a part of the winter driving supplies.

● 7. Driving practices. Here are some of many driving practices that produce winter accidents:

a. Following too closely.

b. Sudden steering motions and speed changes.

c. Driving too fast for conditions.

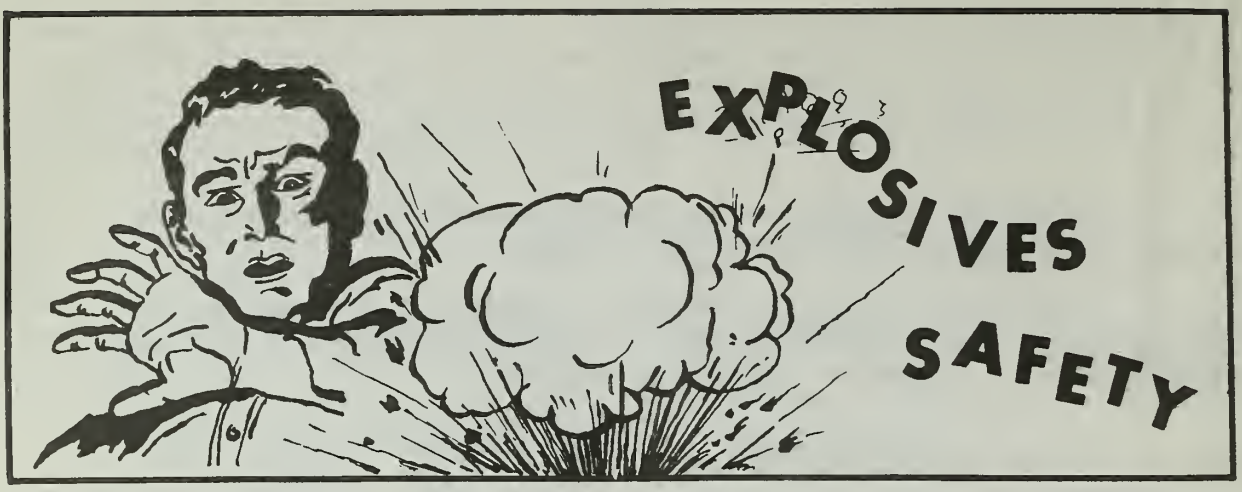
d. Sudden and hard braking.

e. Overdriving your lights at night.

f. Failure to signal your intentions to turn in ample time for the driver behind you to stop on a slippery road.

Additional winter hazards do not stop with the driver and the vehicle. Unless adequate precautions are taken for safe winter walking, falls are likely to occur.

Effective action to turn this information into practice will prevent on-the-job and off-the-job vehicle accidents and personnel injuries.




# PROPER RESPECT FOR HAZARDOUS MATERIAL

J. F. Harbarger, Manager, Safety
Thiokol Chemical Corporation
Huntsville Division

People who make the safest workers are those who have the proper knowledge of hazardous material and correct attitudes toward their jobs and their tools. It is easy to teach potential hazards of materials. Correct attitudes and respect for materials cannot be taught, for it is a delicate matter between unreasonable fear and proper respect for hazardous material. It must be developed by the individual.

When a person is lacking in knowledge of the potential hazards of a material or liquid, he is apt to fear them or handle them in a hazardous way through ignorance of the proper method or precautions to take.

In general, our operations are designed to control potential hazards of hazardous material. This makes it important to know the operation and to use only the approved type tools to accomplish the work. Let's discuss a few.

1. Flammable Liquids. Only approved type containers should be used to handle flammable liquids. Open pails, plastic or glass jars, and other dispensing containers are not safe and should never be used. Flammable liquid containers should be equipped with flame arresters at the faucet to prevent propagation of fire from outside sources. Static charges are produced by the flow of liquid; be sure the container and the drum are properly grounded. Containers of flammable liquids should be labeled. Never put one type of liquid in a container that has been used for another liquid without thorough cleaning. Goggles should be worn to avoid splash burns.

Waste flammable liquids should never be poured down a sink or drain. They should be collected in a proper container and clearly labeled for the disposal people to pick up.

2. Acids and Alkalies. These are the most widely used chemicals in industry. Almost all of them are corrosive to whatever they contact. Hazards associated with use of alkalies and acids result from direct contact with skin or eyes, or from inhalation of vapors. There also may be fire or explosion hazards. Proper devices and procedures are furnished for handlers' protection. If you have any questions do not hesitate to discuss them with a person who is qualified to answer. Do not guess!

3. Propellant Ingredients. The principal precaution when handling propellant ingredients is to guard against accidental ignition by preventing the four heat sources: friction, impact, electricity, and combustion. Because solid propellants contain reactive chemicals, strict adherence to the requirement for personal protective equipment should be exercised. Goggles are required as protection against flash fires or chemical splash. Propellant ingredient contact with the skin should be avoided or limited to minimum amount for the shortest possible time.

4. Hazardous Material Waste. Precautions should be taken to assure that it is disposed of in the prescribed, acceptable manner. Propellant waste should be covered with water in a clearly labeled drum. This drum should be covered and should stand at the propellant waste pickup station. Flammable liquid waste should be collected in an approved-type container that is properly labeled. The containers should be placed in a specially designated area for pickup and delivery to a suitable disposal facility. Never pour flammable liquids down an industrial drain or sewer.

5. Tools, Parts, and Pieces. When contaminated with hazardous material, tools, parts, and pieces should be handled with caution. If such items are moved from one location or operation to another, they must be inspected for contamination and marked accordingly. If contamination is found, a red marked tag (signed by the inspecting authority should be afixed to the equipment involved. When the equipment is free of contamination, a green marked tag should be afixed Decontamination processes involve thorough washing and scrubbing, solvent treatment, or complete flashing, whichever is required to completely remove contamination. Special attention is required to crevices, cracks, and possible hidden "hollow" places.

6. Hazardous Material Handling. Special knowledge and training should result in skillful precautions. The more we learn about the materials with which we work, the more we should respect them. Proper respect demands adequate and safe handling procedures. Safe handling procedures offset fear and correct attitudes. Respect is developed with confidence.

# PILOT SHIELDING FOR HELICOPTER ROCKET TESTS

H. C. Simmons and D. A. Norris
U.S. Army Missile Support Command

A proposed testing of a helicopter-mounted rocket launching system presents problems of pilot safety. An accidental explosion of the rocket motor from the moment of ignition until complete burnout of propellant could easily result in pilot injury or fatality. Properly placed, substantial shielding is needed for his protection.

After completing remote test firing, with the helicopter secured in an elevated position, a pilot must be incorporated into testing operations to actuate the aircraft-installed rocket motor controls. Duron polyester fiberglass armor plating, with its high strength-to-weight ratio, is selected to provide the necessary shielding during the crucial phase of testing.

To establish that a one-half inch thickness of the proposed shielding material can withstand fragments resulting from rocket motor explosion, a comparison of energy levels with a known impact producer has been made. Sheets of one-fourth inch thick Duron have successfully withstood the impact of a fragmentation simulator .50 caliber projectile. The kinetic energy of such a projectile has been computed to be in excess of 3,000 ft/lbs. Computations established the kinetic energy of a motor fragment of similar size to be 270 ft/lbs. The margin of safety thus provided is further increased by doubling the thickness of material to one-half inch.

In addition to fragmentation protection the safety shield is designed to resist the effect of overpressure from rocket motor explosions.

Figure 1 shows the positioning of the safety shield within the helicopter. The shield will be bolted on to a steel frame which is to be fastened to suitable structural members in the cabin floor and roof. The mounting for the shield is to be a rigid rectangular grid type frame made with steel angles. The shield is positioned to prevent fragments from reaching the pilot should a missile motor explosion occur from launch to burnout. Note from Figure 1 that burnout occurs quickly, prior to the missile reaching a position ahead of the nose section of the aircraft.

The considerations listed give some insight into the many and varied hazardous circumstances that can arise during testing of equipment or components which are subject to accidental explosion. Constant, integrated accident prevention efforts, such as the use of the shielding system described, are necessary to achieve the desired goal of missile system testing safety.

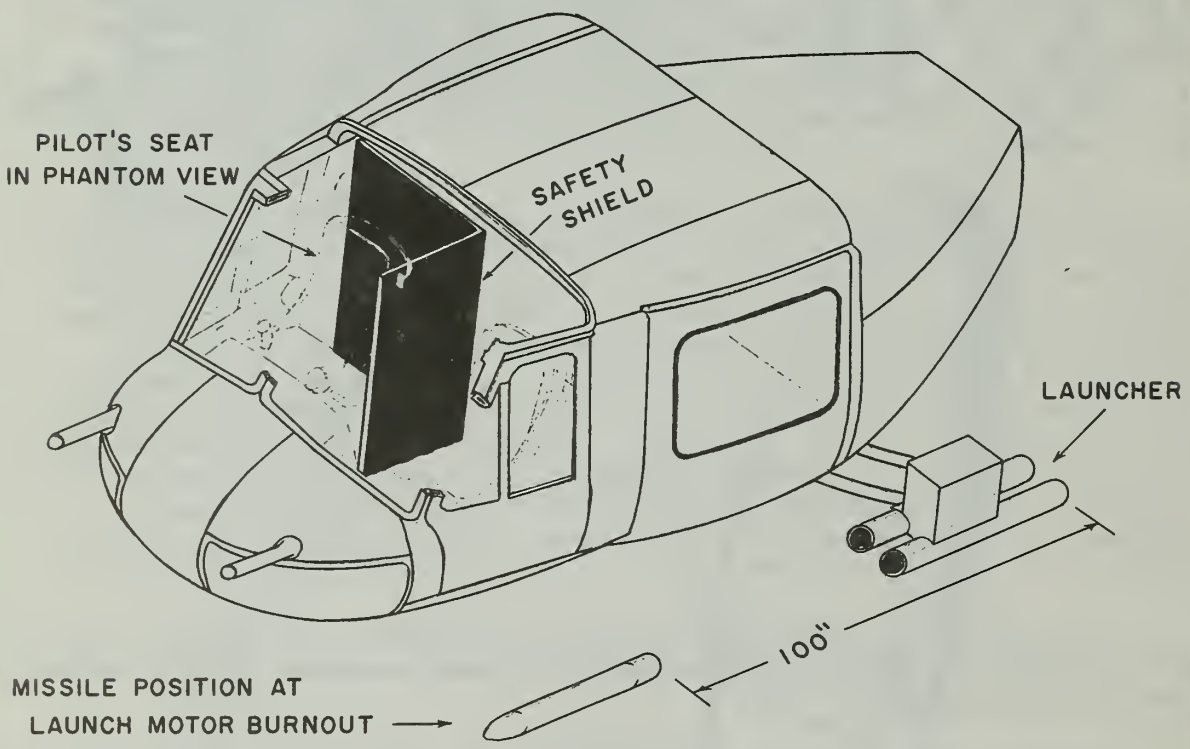



Figure 1. Installation of Safety Shield in Helicopter and Orientation of shield to critical Missile positions.

# MEASURING BLADE CLEARANCES IN VERTICAL PLANETARY PROPELLANT MIXERS

R. T. Smith, Pilot Plant Foreman
Rohm and Haas Company
Redstone Research Laboratories

During the past few years several accidents or near misses have occurred in the propellant industry. Some were caused by improper blade-to-blade, blade-to-wall, or blade-to-bottom mixer clearances. This problem will continue to exist until a method of checking clearances successfully is determined.

To eliminate this hazard in propellant processing at the Rohm and Haas Redstone Research Laboratories, we have developed the following procedure for checking clearance in the Baker Perkins vertical planetary type mixers:

1. Visual Check - Through the standing operating procedure, the operators are required to check the mixer bowl for bulges, scratches or other distortions each day the mixer is in operation.

2. Blade-to-Blade Clearance Check - The clearance between mixer blades is checked each day of operation. (Figure 1) The standing operating procedure for a 5-gallon unit requires the following procedure:

"Manually rotate mixer blades until the upper tips of each align at Point 'A' (See Figure 1); with feeler gauge, measure the clearance at Point 'A', continuing rotation until minimum clearance is reached. Record clearance on data sheet.

"NOTE: Consult supervisor if measured clearance is outside the following range: 0.129± .005."

Procedures for other size mixers require different mean clearances, but tolerances are similar.

3. Blade-to-Wall and Blade-to-Bottom Clearance Check
An abnormality in blade-to-wall or blade-to-bottom clearance might be detected in the first 2 clearance checks, by inference, but the design of the mixer does not permit a direct visual inspection for them. Therefore, a more thorough check is made quarterly, using the following procedure:

"Premix and degas completely a sufficient amount of catalyzed silicone-rubber latex and pour into mixer to a depth of one to 2 inches. Manually rotate blades until outside

blade aligns with reference point on mixer bowl (See Figure 2C). Raise mixer, apply vacuum, and allow to stand for 15-20 hours at 75°F. Turn off vacuum, lower mixer, and remove mold. Inspect mold for any abnormal impression, bisect blade impression cavities, and measure clearance with a micrometer. Compare mold with one previously made, record date made, store for future reference, and log results." (Figures 2A, and 2B.)

The main advantage of this method is that the clearance can be checked under vacuum, better simulating the actual use condition. In tests both with and without vacuum, differences as great as 0.040 have been measured, primarily because of compression of "O" ring seals. Further advantages are that the problem of marring the mixer bowl surface during the check is eliminated, and a permanent, physical record can be kept to determine gradual changes over a long time period.

This method of checking mixer clearance is still in its infancy and several minor changes may be required. However, this procedure has proven satisfactory thus far and has been incorporated in the standing operating procedures for each of our mixers.

Fig. 1 Blade to blade clearances are measured at Point "A" with feeler gauge

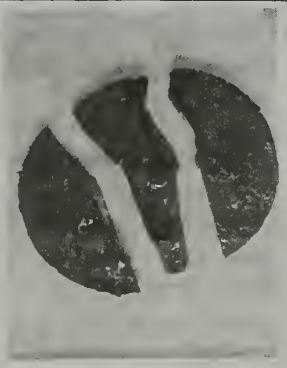


Fig. 2A Silicone rubber mold bisected at blade cavities.

Fig. 2B Cross sectional view of silicone rubber mold showing blade to bottom and blade to wall clearance.

Fig. 2C Blades are rotated until outside blade aligns at reference Point "B" which is the predetermined point of minimum clearance

# OFF-THE-JOB ACCIDENT PREVENTION

Many times we are confronted with a negative attitude on the subject of "off-the-job" accident prevention. Some people say: "Why should we be so concerned about such a program? After all, employees might resent this approach as an invasion of their private lives. It is not possible or practical to affect our employees' activities after they leave the installation." In spite of this, the "off-the-job" movement is continually increasing. As we continue to increase the effectiveness of our installation accident prevention programs, the importance of "off-the-job" accident prevention becomes more apparent every day. Recent statistics on the ratio of occupational to non-occupational deaths and injuries indicate that workers suffer more accidental deaths and injuries off the job than they do on the job.

Why off-the-job accident prevention? Because these accidents affect us in many ways. The killed or injured include those having special skills, ability, valuable experience, fine training and hard-won knowledge which is a financial loss to the government; but the greatest loss, of course, is life itself, the hardships and sorrows that fall on families and the loss to society. In helping to prevent off-the-job accidents, we are not only benefitting ourselves and our installation but are helping to make our community a safer place in which to live.

It is fundamental that a successful safety program must have variety to hold the interest of employees. Inclusion of off-the-installation safety broadens the base for variety and improves general safety morals. Let's not become short-sighted in our thinking of off-the-job accident prevention. Although motor vehicles are the number one menace off the job, there are many more to be considered. We have deaths and injuries from slips and falls, drownings, fire burns, fire arms, poisons, heating equipment and many many others.

Below is a list of items outlining some areas where we as individuals are responsible for off-the-job accident prevention:

1. Providing a safe place for our families to live just as management is responsible for providing a safe place for employees to work.

2. Finding and eliminating home hazards.

3. Thinking for others. We have to think for our children who do not have the adult's ability to recognize things that can hurt them.

4. Participating in community safety efforts.

5. Setting a good example, talking about safety with our families.

6. Developing and using a home hazards checklist.

7. Driving Safely:

   a. Knowing and obeying traffic rules.

   b. Exercising courtesy on the highway.

   c. Keeping our vehicles in good condition.

   d. Being aware of our personal physical condition.

8. Providing our families safe equipment with which to work or play.

9. Practicing on-the-job safety, off the job.

10. Maintaining properly all equipment and facilities in our homes.

Let us not take off-the-job accident prevention for granted. We can substantially reduce non-occupational accidents in our homes and communities if we have a well-organized, aggressive accident prevention program. We will all profit by the results. We will experience great personal satisfaction in the fact that we have contributed toward making better working and safer living conditions for everyone.

# DERMATITIS: CAUSE AND PREVENTION

T. R. Gooch, Safety Engineer
Thiokol Chemical Corporation, Huntsville Division

It has been said that the best doctor you could be is a dermatologist -- a skin doctor. This is because their patients seldom die from their skin trouble but they never get well.

Dermatitis, or skin rash, causes more temporary disability and accounts for more medical expenses than any other form of occupational disease. Skin rash is a nuisance. It makes you downright uncomfortable, and in rare but possible cases it develops into serious illness.

The prevention of dermatitis warrants considerable care and attention.

First, let's discuss the cause of dermatitis. There is a growing tendency to attribute skin rash to the hypersensitiveness of workers to materials that they contact performing their jobs. We call this "allergic to something." Usually it is concluded that the only way to solve the problem is to remove the individual from the exposure.

As a matter of fact, most skin irritations result from handling irritants over a period of time without properly cleaning them from the skin. No one is immune. Improper application of a primary irritant over a long period of time will give anyone dermatitis.

Dermatitis can best be prevented by soap and water cleanliness. Primary irritants are those materials which dissolve the fats from the skin as solvents do, destroy the tissue by hydrolysis or dehydration as acids and bases do, macerate it as some water solutions do, or irritate it in some other way. When you come in contact with primary irritants, wash them off with plenty of soap and water.

Grease and oils are irritants and I have seen wise guys add irritant to irritant by washing grease and oils from their hands with solvents.

Protective creams and lotions will help, of course, but the best prevention for skin rash is simply plenty of soap and water.

Many materials used in propellant or munitions research, development, and manufacture are "skin sensitizers" and will produce typical allergic or hypersensitive dermatitis. Metals, organic nitro, chloro-nitro, and phenolic compounds used in explosives produce sensitization in certain persons.

Skin rash should be reported for treatment when it first develops. Germ introduction or fungus infection may develop from simple rash and the secondary condition is more serious and harder to cure.

To prevent dermatitis, the primary objective is to avoid contact with materials, or reduce contact as much as possible. Personal cleanliness to reduce the duration of contact is the most important factor in preventive measures.

Wash with soap and water. Keep your clothing clean and avoid contaminating your street clothes by keeping work clothes and street clothes separated. Keep machines and work locations clean to avoid unnecessary contact.

To prevent dermatitis, keep clean.

— - —

## SAVANNA ARMY DEPOT ACHIEVES 1,000-DAY SAFETY RECORD

The Savanna Army Depot recently achieved a record of 1,000 consecutive days without a recordable disabling injury for any of its 1,100 employees. Injury-free manhours exceeded

4,000,000, and the record was continuing. This was the first time in the 49-year history of the Depot that a 1,000-day total had been achieved. Colonel B. B. Abrams, Commanding Officer is shown sawing a fourth digital slot in the talley board which previously allowed room for only three numerals. Roland C. Unangst, Safety Director, stands near the Commanding Officer's shoulder.

* * * *

## NSC SAFETY AWARD NOTIFICATION

Watervliet Arsenal received notification that a National Safety Council Award of Honor will be awarded for the operation of 3,742,957 manhours without a disabling injury from 19 August 1965 to 17 April 1966.

## PHOTO OF LIGHTNING STRIKE AT LOUISIANA ARMY AMMUNITION PLANT

# OUR STOP SIGNS ARE RETIRING

Samuel J. Ryan, Senior Engineer
Lone Star Division, Day & Zimmermann, Inc.
Lone Star Army Ammunition Plant

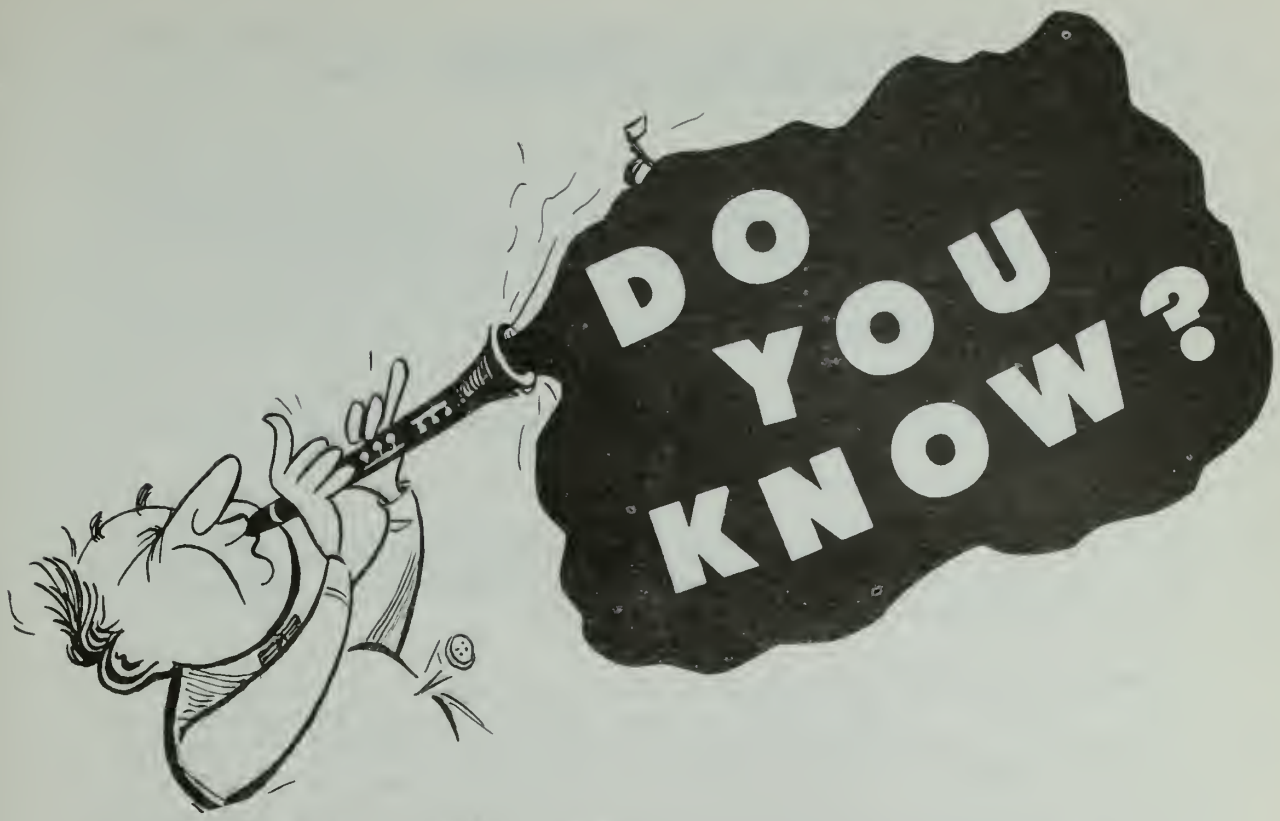
Traffic stop signs are retiring at Lone Star Army Ammunition Plant. We are replacing them with bright new "Yield Right of Way" signs at our road intersections.

Why are these being used instead of stop signs? In the past few years traffic has increased on our state and national highways, and correspondingly it has increased at Lone Star. As with all traffic control agencies, Lone Star safety officials are on the lookout for safer yet faster methods of handling increased traffic. Taking our cue from the Bureau of Public Roads and state highway departments, we found that an increasing number of yield signs were replacing the well known stop sign.

Two years ago our safety officials agreed to "give it a try" by installing 25 yield signs to replace stop signs at strategic intersections throughout the plant. During this time our traffic control personnel continuously observed the effects of this replacement on our traffic flow. This experiment showed us that it is common sense to use yield signs. We have found that it is just as safe to use them. We have had no accidents at these intersections since the yield signs were installed.

Lone Star management is convinced that these yield signs will pay off in better traffic control. So great is this conviction that all of the stop signs throughout the plant, except those at guard checkpoints and entrances to major highways, are being replaced with yield signs.

Our stop signs have served long and well, but now they are retiring to make way for newer and more modern methods.




Here are ten questions that will test your knowledge of safety requirements that you will need under different circumstances. The answers to all of them may be found in AMCR 385-224. How many can you answer without referring to the regulation? The correct answers and references appear on pages 38 and 39 .

1. How do you determine the unbarricaded area in front of an igloo magazine?

   Answer and Reference:

2. What protection is provided by inhabited building distance?

   Answer and Reference:

3. Missile distance is the same as inhabited building distance for which classes of ammunition?

   Answer and Reference:

4. When hunting is permitted within an installation that has explosives or ammunition, what is the maximum muzzle velocity of ammunition that may be used?

   Answer and Reference:

5. What should be required if heat-producing equipment exceeding 228°F. is to be used in an explosives area?

   Answer and Reference:

6. What must be done with loose explosives that have been swept up from the floor of an operating building?

   Answer and Reference:

7. May a static grounding be made to a steam line?

   Answer and Reference:

8. What is the best system for collecting solid propellant in a renovation or demilitarization operation where complete rounds are broken apart?

   Answer and Reference:

9. How wide a firebreak must be maintained around an above-ground magazine that contains ammunition or explosives?

   Answer and Reference:

10. Is it permissible to use compressed air for cleaning and drying purposes?

    Answer and Reference:

## C. F. CRAVER,

## RAVENNA ARMY AMMUNITION PLANT, DEAD AT 54

Clarence F. Craver, 140 Bane Avenue, Newton Falls, Ohio, died at 1600 hours, Wednesday, 22 June 1966, at Northside Hospital, Youngstown. He was 54.

For the past 25 years he had been associated with the Ravenna Army Ammunition Plant, and was Safety, Training, and Security Manager for Ravenna Arsenal, Inc., operating contractor, since 18 February 1952.

In 1959, Mr. Craver was honored as the Newton Falls "Man of the Year" for his outstanding efforts and devotion to community service, which included his work with the American Society of Safety Engineers, McKinley Chapter, and the Youth Safety Commission of Northeastern Ohio.

# REFERENCE PUBLICATIONS

AR 27-23, 20 May 1966
Legal Services - Claims Incident to Use of Government Vehicles and Other Property of the United States Not Cognizable Under Law.

AR 40-61, 27 May 1966
Medical Service - Medical Materiel Policies and Procedures.

AR 385-40, June 1966
Safety - Accident Reporting and Records.

AR 420-76, 22 April 1966
Repairs and Utilities - Entomology Services (see paragraph 14, Protection and transportation of toxic pesticides).

AR 750-32, 27 May 1966
Maintenance of Supplies and Equipment - Air Delivery, and Aircraft Personnel Ejection Systems.

AMCR 70-14, 14 June 1966
Research and Development - Processing Qualitative Materiel Requirements, Small Development Requirements, and Qualitative Materiel Development Objectives.

AMCR 385-15, 3 June 1966
Safety - Policy and Procedures for Implementation of Peacetime Safety Rules For Nuclear Weapons.

AMCR 611-4, 19 May 1966
Personnel Selection and Classification - Selection, Retention, and Personnel Security Criteria For Personnel In Nuclear Weapons Positions.

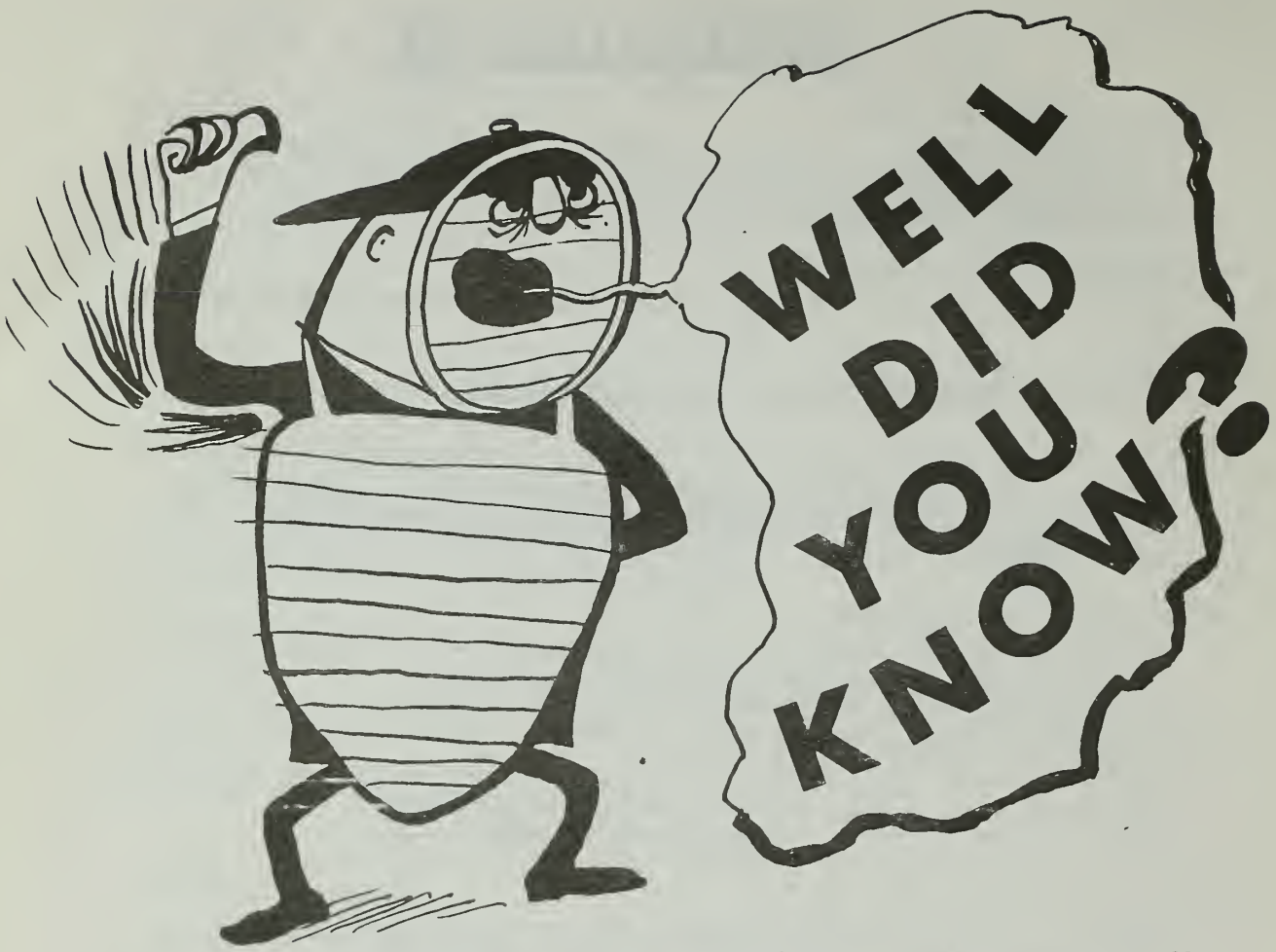
DA Cir 11-7, 27 May 1966
Army Programs - Environmental Pollution Abatement

DA Cir 385-12, 1 June 1966
Safety - Safe Operation of Truck, Utility, 1/4 Ton, 4x4, M151.

DA Cir 385-15, 30 June 1966
Safety - Safety Educational Materials

DA Cir 420-18, 2 May 1966
Water Pollution Control - Wash Rack Wastes

AMC Cir 310-17, 21 June 1966
Military Publications - Status of USASMC Publications and Changes to AMC and USASMC Publications Reference to USAMC.




Here are the answers to the questions on pages 35 and 36 All questions were based on information contained in AMCR 385-224. A reference to the pertinent paragraph follows each answer.

1. The unbarricaded area in front of an igloo magazine is bounded by lines drawn from the center of the door and inclined 30° on either side of a perpendicular to the door. Reference: Paragraph 1726b.

2. Inhabited building distance protects against "substantial" structural damage. In general, damage which is readily repairable is not considered to be substantial within the definition established by the AMC Safety Manual. Reference: Paragraph 1702b.

3. Missile distance is the same as inhabited building distance for ammunition in classes 3, 4, 5, and 6. The missile distance is based on the limiting range of a majority of the missiles for the type of ammunition involved. Occasional missiles may be projected farther. Reference: Paragraph 1707.

4. Cartridges having a muzzle velocity greater than 2,300 feet per second shall not be used within an establishment containing explosives materials. Reference: Paragraph 1604.

5. A written permit should be required for the temporary use of heat-producing equipment. The permit should state the location, time, duration, purpose of use, details of safety and firefighting equipment, and the names of the workmen who will operate the equipment, or the name of the immediate supervisor. Reference: Paragraph 1606.

6. All loose explosives recovered as sweepings from floors of operating buildings shall be destroyed. Reference: Paragraph 1620a.

7. A static grounding should not be made to a steam line. Reference: Paragraph 702.

8. Removal of the solid propellant from the pull-apart is best accomplished by a properly designed vacuum-type collecting system. Reference: Paragraph 2505a.

9. A firebreak at least 50 feet wide and free of combustible materials must be maintained around the magazine that contains ammunition or explosives. Reference: Paragraph 1216a.

10. The use of compressed air for cleaning and drying purposes should be permitted only when all other means have failed. Reference: Paragraph 925.

## ● SAFE DRIVING

## BRINGS EMPLOYEE RECOGNITION

Fifteen years of accident and violation-free driving of military vehicles won an award for William F. McMillian, a driver at the U.S. Army Aviation Materiel Laboratories, Fort Eustis, Virginia. Mr. McMillian is shown accepting an Army Certificate of Commendation, a $150 check, and congratulations from Lt. Colonel John W. Elliott, Commanding Officer, AVLABS.

**WORK SAFELY-** "REDUCE FEDERAL EMPLOYEE WORK INJURIES 30% BY 1970"

**FEDERAL SAFETY COUNCIL**

UNIVERSITY OF FLORIDA
3 1262 09304 9392
FLARE

UNITED STATES ARMY MATERIEL COMMAND

WASHINGTON, D.C. 20315